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March 28, 2014

Mr. Richard Hyde
Executive Director
Texas Commission on Environmental Quality
P.O. Box 13087, MC 100
Austin, Texas 78711-3087

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Executive Director

Re: Application of the Lower Colorado River Authority for Emergency Reduction of the Instream Flow Requirements Under its Water Management Plan For Lakes Buchanan and Travis (Permit 5838)

Dear Mr. Hyde:

Pursuant to the March 27, 2014 notification from Texas Commission on Environmental Quality ("TCEQ") and pursuant to Texas Water Code §§5.506 and 11.148¹, the Texas Parks and Wildlife Department ("TPWD") respectfully submits the following comments on the March 21, 2014 Application of the Lower Colorado River Authority ("LCRA") for Emergency Reduction of Instream Flow Requirements Under Its 2010 Water Management Plan ("WMP") for Lakes Buchanan and Travis ("emergency suspension application").

In the emergency suspension application, LCRA seeks TCEQ Executive Director approval to deviate from conditions of the WMP. Specifically, LCRA requests a reduction to 300 cubic feet per second (cfs) of the WMP instream flow requirement of maintaining a flow of 500 cfs in the Colorado River between Bastrop and Eagle Lake for a continuous period of not less than six weeks from March through May to protect the state-threatened Blue Sucker (*Cycleptus elongatus*).

Please be advised that TPWD does not oppose LCRA's request and recognizes the challenging drought related conditions that continue to plague the Colorado River basin. TPWD does appreciate the opportunity to provide relevant background scientific data and information to assist TCEQ in considering this important matter.

Introduction and Position

TPWD is the state agency charged with primary responsibility for protecting the state's fish and wildlife resources.² In this regard, TPWD seeks to ensure that the best

¹ Texas Water Code §5.506(b) states with regard to an emergency or temporary order suspending permit condition relating to beneficial inflows to affected bays and estuaries and instream uses, "... The commission shall give the Parks and Wildlife Department an opportunity to submit comments on the proposed action for a period of 72 hours from receipt of the notice and must consider those comments before issuing an order implementing the proposed action." Tex. Water Code §11.148(b) contains identical language.

² Tex. Parks & Wild. Code §12.0011.

available data and science regarding Colorado River conditions and the status of the state-threatened Blue Sucker are provided for your consideration.

TPWD understands and appreciates the drought conditions in the Lower Colorado River Basin as described by LCRA in its emergency suspension application. TPWD also recognizes that significant relief for the competing water demands will only be provided by a substantial increase in rainfall. Based upon drought conditions, current and recent Colorado River instream flows and temperatures, and based upon best available science, TPWD does not oppose LCRA's request.

Please know that TPWD has been collaborating with LCRA regarding the conservation needs of the Blue Sucker. To that end, TPWD is preparing to launch a three-year study relating instream flows to Blue Sucker spawning movements, habitat use, and recruitment in the lower Colorado River. This study will help fill in knowledge gaps related to the Blue Sucker and can inform TCEQ, LCRA, and other Colorado River stakeholders in future decisions affecting instream flow needs. LCRA management has represented that LCRA expects to support TPWD's Blue Sucker study by offering assistance with water quality and temperature modeling and will also assist with additional fish tagging during our routine monitoring. Additionally, LCRA is interested in discussing with TPWD opportunities that may exist for LCRA to manage the releases it makes for other downstream customers in a manner that can also provide more environmental flow benefits.

Background of WMP Requirements for Instream Flow and Blue Sucker Protection

The WMP, which was approved by the TCEQ in January 2010, acts as an extension of LCRA's water rights for the Highland Lakes. The WMP requires LCRA to provide water to meet instream use needs based upon combined lake storage and inflows into the lakes. Under current conditions, the WMP requires the LCRA to ensure that at least 500 cfs is maintained in the Colorado River from Bastrop to Eagle Lake for a continuous period of not less than six weeks between March and May to support Blue Sucker populations. These instream flows may be met by a variety of sources, such as releases for downstream users, return flows, and rainwater runoff. LCRA's obligation to release water from the Highland Lakes pursuant to the WMP is only triggered if the specified instream flows are not met by other combined sources.

The 500 cfs requirement is primarily based upon a study that contained observations of Blue Sucker spawning in the lower Colorado River, as well as the best professional judgment of fisheries biologists familiar with the life history and biological needs of this species (Mosier and Ray 1992). BIO-WEST (2008) developed habitat-flow relationships for spawning Blue Sucker in the

lower Colorado River confirming that 500 cfs provides substantial, quality spawning habitat.

Blue Sucker, *Cycleptus elongatus*, is a big river fish that is highly specialized for fast water riverine habitat. In Texas, Blue Sucker occur in the Red River, Sabine, Neches, Colorado, and Rio Grande drainages. Blue Sucker were once abundant, but their range and population size have been reduced and it is listed as a state-threatened species (1977, 31 Texas Administrative Code §65.175). Blue Sucker may live more than 20 years and grow to lengths over 800 mm. In the lower Colorado River, adult Blue Sucker spawn from February – March when water temperature increases to 15-18° C (58-65° F); spawning may begin as early as January and could extend into April depending on climatic conditions. Blue Sucker may make long spawning migrations under high streamflow conditions (BIO-WEST 2008). Spawning occurs in deep, high current velocity rapids and fertilized eggs stick to rocky substrate. Information about larval and juvenile habitat use in the lower Colorado River is lacking and no samples of juvenile Blue Sucker have been reported.

The Mosier and Ray study recommended flow of 500 cfs also provides connectivity between spawning habitats and deeper areas of habitat that are utilized by adult Blue Suckers before and after spawning. The Mosier and Ray study was a stratified approach to the development of flow recommendations designed to protect the diverse native fish community of the Colorado River downstream of the Highland Lakes. In addition to providing for the needs of Blue Sucker, the 500 cfs flow during the spring also supports good water quality, recreation and habitat for other fish and wildlife species. In the absence of higher flows and pulse events, aquatic macrophytes such as hydrilla and water hyacinth can become established throughout the lower portion of the Colorado River.

LCRA Selection of 300 cfs Flow to Protect Blue Sucker

The 2010 WMP requirements related to the Blue Sucker are intended to provide some protection for seasonal spawning, but they were not designed to provide a full instream flow regime to protect a range of instream needs. It is generally recognized by instream flow scientists that a flow regime using a full range of flow components is needed to maintain fully functioning streams. Variations in the magnitude, frequency, duration, timing, and rate of change of stream flows are all critical components of a natural flow regime (Poff et al., 1997). Variability in stream flow is manifested to stream biota as a change in habitat availability. Consequently, the life histories of stream fishes and other aquatic organisms are adapted to the seasonal and inter-annual variability of low, base, and high flow components. Hydrologic pattern and variability are therefore key determinants of aquatic community structure and stability (Poff and Ward, 1989; Poff et al., 1997; Richter et al., 1996, Dilts, et al., 2005).

As set out in the emergency suspension application, LCRA's request to reduce flows to protect Blue Sucker from 500 cfs to 300 cfs is based in part upon a study conducted by BIO-WEST (2008) that produced recommendations for instream flow regimes in the lower Colorado River. The BIO-WEST study relied in part on modeling of habitat versus flow relationships for habitat guilds and the state-threatened Blue Sucker and was used to formulate environmental flow regimes at several locations. Spring season flows of approximately 300 cfs are one component of a complete environmental flow regime that included a full range of flows to reflect subsistence, base, and high flow pulse conditions as shown in the table below from the Executive Summary of the BIO-WEST report:

Table ES.1. Instream Flow Guidelines for the lower Colorado River specific to the LSWP.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
AUSTIN REACH												
Subsistence	50	50	50	50	50	50	50	50	50	50	50	50
BASTROP REACH												
Subsistence	200	274	274	184	275	202	137	123	123	127	180	186
Base-DRY	313	317	274	287	579	418	347	194	236	245	283	311
Base-AVERAGE	433	497	497	635	824	733	610	381	423	433	424	450
COLUMBUS REACH												
Subsistence	340	375	375	299	425	534	342	190	279	190	202	301
Base-DRY	487	590	525	554	966	967	570	310	405	356	480	464
Base-AVERAGE	828	895	1,020	977	1,316	1,440	895	516	610	741	755	737
WHARTON REACH												
Subsistence	315	303	284	270	304	371	212	187	188	147	173	202
Base-DRY	492	597	531	561	985	984	577	314	410	360	486	470
Base-AVERAGE	838	906	1,036	1,011	1,397	1,512	906	522	617	749	764	746
COLORADO RIVER DOWNSTREAM OF AUSTIN												
PULSE FLOWS												
Base	MAGNITUDE (2,000 to 3,000 cfs); FREQUENCY (8-10 times annually); DURATION (3-5 days)											
High	MAGNITUDE (@ 8,000 cfs); FREQUENCY (2 Events in 3 year period); DURATION (2-3 days)											
CHANNEL MAINTENANCE												
	MAGNITUDE (27,000 - 50,000 cfs); FREQUENCY (1 Event in 3 years); DURATION (3 days)											
OVERBANK												
	MAGNITUDE (> 30,000 cfs); FREQUENCY and DURATION (Naturally Driven)											

The 2014 conditions would correspond with the subsistence flow guidelines in the above table. Within the flow regime, the BIO-WEST study calculated that a flow of approximately 300 cfs supports 86% of the maximum available Blue Sucker spawning habitat in the Columbus reach (Table 4.9, BIO-WEST 2008) and over 92% in the Bastrop reach (Table 4.11, BIO-WEST 2008). According to the model, higher flows (such as 500 cfs) would increase the amount of Blue Sucker spawning habitat in the lower Colorado River. Higher flows would also provide additional habitat for adult Blue Suckers and increase connectivity to suitable spawning habitat.

Current Lower Colorado River Conditions

While TPWD does not oppose LCRA's request to temporarily reduce the instream flow requirement from 500 cfs to 300 cfs, it is important to understand that the 300 cfs flow recommendation cannot be examined in isolation, nor is it easily comparable to the current 500 cfs requirement. As shown in the BIO-WEST study, the relationship between flows approximating 300 cfs and the expected protection of 86% of Blue Sucker spawning habitat is supported when those 300 cfs flows occur in combination with the full array of varying flows provided as part of a comprehensive instream flow regime. The BIO-WEST based comprehensive flow regime is not required in the current WMP. If the current 500 cfs flow requirement is reduced to 300 cfs, the 300 cfs flows will occur in the absence of a full, varying instream flow regime. The expected percentage of protected Blue Sucker spawning habitat at 300 cfs is unknown. Except for the six week period of 500 cfs for Blue Sucker spawning, LCRA currently is only required to maintain a minimum flow of 120 cfs in the Colorado River from Bastrop downstream to Eagle Lake. There is no direct comparison of the effect on spawning habitat from a 300 cfs flow occurring without a full instream flow regime to the effect on spawning habitat from a 300 cfs flow occurring within a full instream flow regime. To help address this knowledge gap, an assessment of current and recent river conditions is necessary to evaluate the impact of a 300 cfs flow on Blue Sucker spawning and habitat.

High flow pulse events in fall 2013 scoured the lower Colorado River of large vegetative mats that had accumulated following a prolonged low flow period, improving water quality and physical conditions. Flows of near 300 cfs since the beginning of 2014 have since maintained a water quality suitable for aquatic biota. Recent conditions were appropriate for Blue Sucker to spawn.

TPWD biologists surveyed three sites for Blue Sucker spawning activity and to collected adults to assess gonad condition. Water temperature was nearly 19° C. Eight large, fully tuberculated, and fertile males were collected in a rapid near La Grange, Texas on March 19. One large female that had spent ovaries (i.e., she had likely completed spawning for the season) was collected near Utey on March 20, 2014. No Blue Suckers were collected at Smithville rapids and no active spawning was confirmed at any of the sites. These observations suggest that spawning may be occurring (fertile males) but may be completed for some fish (spent female) which aligns well with spawning conditions reported previously.

The requirement of the WMP for which LCRA is seeking relief relates only to the Blue Sucker. However, it is important to note that releases for the Blue Sucker provide ancillary benefits to other fish and wildlife species and their habitats in the lower Colorado River. This includes the State Fish of Texas, Guadalupe Bass (*Micropterus treculii*). Historic flow conditions in the lower

Colorado River supported healthy populations of Guadalupe Bass, contributing to a highly valued sport fishery that produced the current State Record Guadalupe Bass in February 2014.

New TPWD Study of Blue Sucker Habitat, Spawning, and Recruitment

TPWD is preparing to initiate a three-year study in the lower Colorado River. The primary objective of this research is to provide information to assess the effects of varied streamflow levels on habitat use and reproductive success of Blue Sucker in the lower Colorado River. Specific study components include a better understanding of the life history strategy, movement and habitat requirements of various life stages, growth rates and aging, population estimates, and reproductive ecology. This study will develop the best available science and fill critical data gaps to inform TCEQ, LCRA, and other Colorado River stakeholders in future decisions affecting water supply needs in the basin. It is expected that LCRA will offer assistance with water quality and temperature modeling and will also assist with additional fish tagging during our routine monitoring.

To support this study and to gain an understanding of current conditions within the basin, field efforts have been initiated recently by TPWD. Longitudinal temperature monitoring along the river will provide diurnal water temperature data. This data can also be incorporated into a dynamic water quality modeling analysis to show water quality changes and trends under various streamflows. Additional Blue Sucker collection efforts surrounding known spawning locations will provide spawning condition and movement pattern information. Larval fish sampling may also indicate reproductive success and recruitment of young-of-year fish.

Conclusion

Based upon the best available science and the current river conditions described above, TPWD does not oppose LCRA's request to reduce flows from 500 cfs to 300 cfs in the Colorado River between Bastrop and Eagle Lake for a continuous period of not less than six weeks from March through May to protect the state-threatened Blue Sucker.

To assist in developing the science needed to better understand the future conservation needs of the Blue Sucker, TPWD is committed to working with LCRA to implement several important actions, including:

- Commencing required releases as soon as possible (if necessary to maintain 300 cfs at Bastrop to Eagle Lake) to support Blue Sucker spawning and larval development as needed;

Mr. Richard Hyde

Page 7 of 8

March 28, 2014

- Filling in key information gaps by investigating flow and temperature conditions that support Blue Sucker life stages; and
- Improving management of Blue Sucker spawning flows based on more complete biological information to allow development of : biologically based triggers based on temperature and spawning condition and refinement of timing, magnitude, and duration of flows to maximize efficiency.

Thank you for the opportunity to provide biological input on this important matter in the Colorado River Basin. Should you have any questions at all, please do not hesitate to contact me at (512) 389-4802.

Sincerely,



Carter Smith

Executive Director

CS:CBB:dh

cc: Mr. Phil Wilson, General Manager, LCRA

Ms. Ann Bright

Ms. Colette Barron-Bradsby

Citations

- BIO-WEST, Inc. 2008. *Lower Colorado River, Texas, Instream Flow Guidelines, Colorado River Flow Relationships to Aquatic Habitat and State Threatened Species: Blue Sucker*. Prepared for Lower Colorado River Authority and San Antonio Water System; Round Rock, Texas.
- Dilts, E., Leonard, P., and Hill, D. 2005. *Development of an Integrated Flow Regime Recommendation for the Cheoah River, N.C.* From: Proceedings of the 2005 Georgia Water Resources Conference, held April 25-27, 2005, at the University of Georgia. Kathryn J. Hatcher, editor, Institute of Ecology, The University of Georgia, Athens, Georgia. Available at: <http://www.uga.edu/water/publication/uploads/DiltsE-GWRCpaper.pdf>
- Mosier, D.T. and R.T. Ray. 1992. *Instream Flows for the Lower Colorado River: Reconciling Traditional Beneficial Uses with the Ecological Requirements of the Native Aquatic Community*. Lower Colorado River Authority, Austin, Texas.
- Edwards, R.J. 1980. The ecology and geographic variation of the Guadalupe bass, *Micropterus treculi*. Unpubl. Ph.D. Dissertation, University of Texas at Austin. 224 pp.
- Perkin, J.S., Z.R. Shatuck, P.T. Bean, T.H. Bonner, E. Saraeva, T.B. Hardy. 2010. Movement and microhabitat association of Guadalupe bass in two Texas rivers. *North American Journal of Fisheries Management* 30:33-46.
- Poff, N.L. and Ward, J.V. 1989. Implications of Streamflow Variability and Predictability for Lotic Community Structure: a Regional Analysis of Streamflow Patterns. *Canadian Journal of Fisheries and Aquatic Sciences* v46. pp 1805-1818.
- Poff, N.L., Allan, J.D., Bain, M.B., Karr, J.R., Prestegard, K.L., Richter, B.D., Sparks, R.E., and Stromberg, J.C. 1997. The Natural Flow Regime: A Paradigm for River Conservation and Restoration. *BioScience*. v47. n11. pp 769-784.
- Richter, B.D., Baumgartner, J. V. Powell, J. and Braun, D.P. 1996. A Method for Assessing Hydrologic Alteration Within Ecosystems. *Conservation Biology* v10 pp.1163-1174.